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Research  
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## Movement of the gender regulating Hormones Estradiol and Testosterone in Intact Soil Columns

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### **Why Does it matter?**

Animal waste such as broiler litter contains varying amounts of the sex hormones estradiol and testosterone. After land application these hormones may be transported through soil to groundwater where they may have adverse effects on human and wildlife development. Understanding the transport mechanisms of these hormones is important in relation to developing waste management practices.

### **What was done?**



Several intact soil columns were removed from a study site at JPC and taken to a laboratory at the University of Georgia. Known concentrations of estradiol and testosterone were applied to the surface of the soil columns previously saturated with water. A known quantity of water was applied to the columns and water coming out the end of columns was collected and analyzed for the hormones.

### **What was found?**

Although most of the hormones remained in the soil columns and most likely adsorbed to the soil organic matter, a significant fraction of the hormones moved through the cracks, worm holes, and large pore spaces of the soil columns. The detection and quantification of the hormones in the water collected at the end of the column demonstrated their transport under conditions of preferential flow.

### **What is the impact?**

Millions of tons of animal waste such as poultry litter are applied to agricultural fields. Results of this research indicate that under conditions of heavy rains and saturated soils, the sex hormones from poultry litter applications may move through soil and contaminate groundwater. This information can be used by the poultry industry and environmental agencies to ensure safe application of the 14 million tons of poultry litter generated annually in the USA.

### **Research Team and Contact information**

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